

What is claimed is:

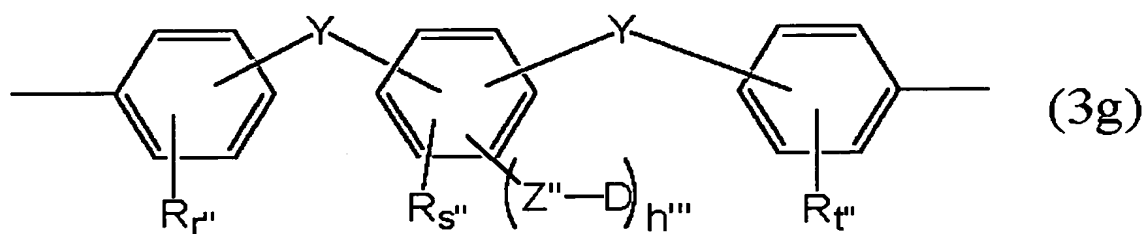
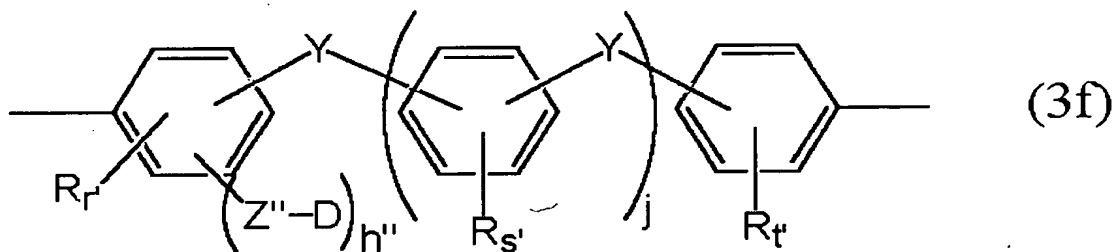
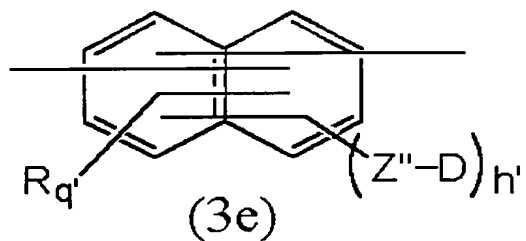
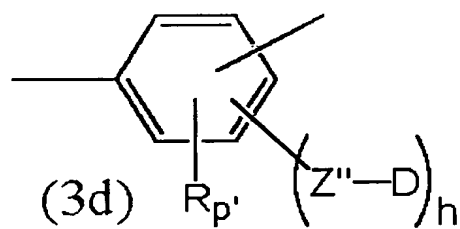
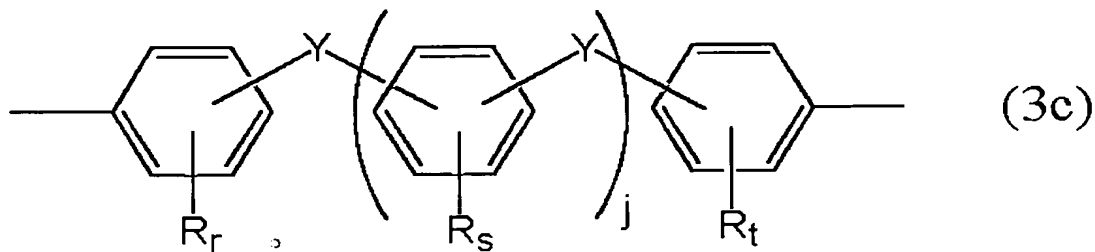
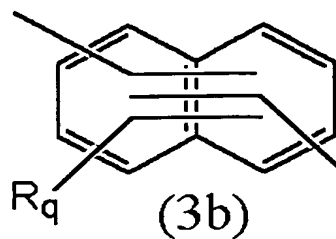
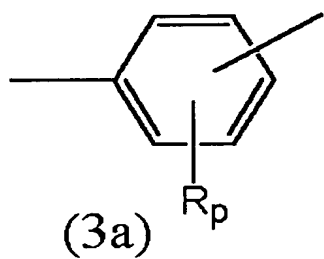
1. A laminated membrane comprising a membrane (I) which comprises aromatic polymer electrolyte containing a super strong acid group and a membrane (II) which comprises one electrolyte selected from the group consisting of perfluoroalkylsulfonic acid polymer electrolytes and non-super strong acid polymer electrolytes.

2. The laminated membrane according to Claim 1, wherein aromatic polymer electrolyte containing the super strong acid group is represented by the following general formula (1):



(wherein, A represents a divalent aromatic group and A' represents a divalent aromatic group on which super strong acid group has been substituted. Z, Z' represent each independently a direct bond or divalent group. m, n represent the number of repeating units, n is in the range of 10 to 100000, n repeating units may be the same as or different from each other, and m is in the range of 0 to 100000, m repeating units may be the same as or different from each other.).

3. The laminated membrane according to Claim 2, wherein A represents a divalent aromatic group selected from the following general formulae (3a) to (3c), and A' represents a divalent aromatic group selected from the following general formulae (3d) to (3g):



(wherein, R represents a hydroxyl group, alkyl group having 1 to 6 carbon atoms, alkoxy group having 1 to 6 carbon atoms, aralkyl group having 7 to 12 carbon atoms, aryl group or halogen.

p, r, s and t represent each independently a number of from 0 to 4, and q represents a number of from 0 to 6, and when there are a plurality of Rs, these may be the same or different. j represents a number of 0 or 1. Y represent a direct bond or divalent group, and when there are a plurality of Ys, these may be the same or different. Z'' and Y represent each independently a direct bond or divalent group, and when there are a plurality of Z''s, these may be the same or different, and D represents a super strong acid group, and when there are a plurality of Ds, these may be the same or different. h, h'' and h''' represent each independently a number of from 1 to 4, h' represents a number of from 1 to 6, (p'+h), (r'+h'') and (s'+h''') represent each independently a number of from 1 to 4, s', t', r' and t' represent each independently a number of from 0 to 4, (q'+h') represents a number of from 1 to 6, and j represents a number of 0 or 1.).

4. The laminated membrane according to Claim 3, wherein Z, Z' and Y represent each independently a group selected from a direct bond, -O-, -S-, -CO-, -SO<sub>2</sub>-, alkylene groups having 1 to 20 carbon atoms and alkylenedioxy groups having 1 to 20 carbon atoms, and Z'' represents a group selected from the group consisting of a direct bond, -O-, -S-, -CO-, -SO<sub>2</sub>-, alkylene groups having 1 to 20 carbon atoms optionally substituted with fluorine, alkylenedioxy groups having 1 to 20 carbon atoms optionally substituted with fluorine, arylene groups having 6

to 12 carbon atoms optionally substituted with fluorine, aryleneoxy groups having 6 to 12 carbon atoms optionally substituted with fluorine and alkyleneoxy groups having 1 to 20 carbon atoms optionally substituted with fluorine.

5. The laminated membrane according to Claim 2, wherein the super strong acid group is selected from group of the following general formulae (2a) to (2d):

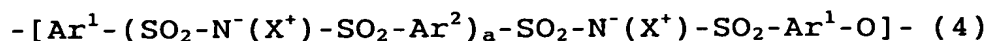


(wherein, G represents an alkylene group of which hydrogen atoms are partially or totally substituted with fluorine, aralkylene group of which hydrogen atoms are partially or totally substituted with fluorine or arylene group of which hydrogen atoms are partially or totally substituted with fluorine,  $\text{W}^+$  represents a cation, E represents an alkyl group of which hydrogen atoms are partially or totally substituted with fluorine, aralkyl group of which hydrogen atoms are partially or totally substituted with fluorine or aryl group of which hydrogen atoms are partially or totally substituted with fluorine.).

6. The laminated membrane according to Claim 5, wherein W represents a hydrogen ion.

7. The laminated membrane according to Claim 1, wherein

aromatic polymer electrolyte containing the super strong acid group is a polymer having a polymerization unit of the following formula (4):



(wherein,  $\text{Ar}^1$ ,  $\text{Ar}^2$  represent each independently a divalent aromatic group optionally having a substituent,  $a$  represents an integer of 0 to 3, and  $\text{X}^+$  represents an ion selected from a hydrogen ion, alkali metal ions and ammonium.).

8. The laminated membrane according to Claim 7, wherein aromatic polymer electrolyte containing the super strong acid group is a polymer further having a repeating unit of the following formula (5)



(wherein,  $\text{Ar}^3$  represents a divalent aromatic group optionally having a substituent.)  
in its main chain.

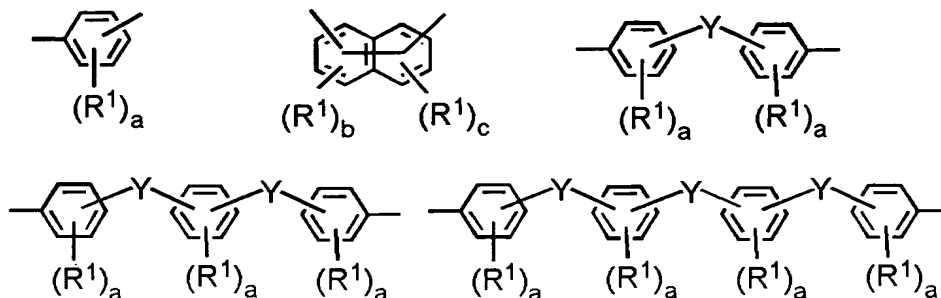
9. The laminated membrane according to Claim 8, wherein aromatic polymer electrolyte containing the super strong acid group is a polymer further having a repeating unit of the following formula (6)



(wherein,  $\text{Ar}^4$  represents a divalent aromatic group optionally having a substituent.)  
in its main chain.

10. The laminated membrane according to Claim 7, wherein

the divalent aromatic group optionally having a substituent is at least one selected from the following aromatic groups:



(wherein,  $R^1$  represents a hydrocarbon group having 1 to 10 carbon atoms, hydrocarbonoxy group having 1 to 10 carbon atoms, acetyl group, benzoyl group, nitrile group, sulfonic group, carboxyl group, phosphonic group or halogen atom,  $a$  represents an integer of from 0 to 4, and  $b$ ,  $c$  represent an integer of from 0 to 4, the sum of  $b$  and  $c$  is being from 0 to 6. When there are a plurality of  $R^1$ 's, these may be the same or different.  $Y$  represents a direct bond,  $-O-$ ,  $-S-$ ,  $-C(O)-$ ,  $-SO_2-$  or  $-C(R^3)_2-$ .  $R^3$  represents a hydrogen atom, hydrocarbon group having 1 to 10 carbon atoms, halogenated hydrocarbon group having 1 to 10 carbon atoms, and two  $R^3$ 's may be the same or different and may form a ring. When there is a plurality of  $Y$ 's, these may be the same or different.).

11. The laminated membrane according to Claim 7, wherein  $Ar^1$  represents tetrafluorophenylene.

12. The laminated membrane according to Claim 7, wherein  $a$  represents 0 or 1.

13. The laminated membrane according to Claim 7, wherein

aromatic polymer electrolyte containing the super strong acid group is a block copolymer having at least one block having a repeating unit of the formula (4) and a repeating unit of the formula (5).

14. The laminated membrane according to Claim 7, wherein  $X^+$  represents a hydrogen ion.

15. The laminated membrane according to Claim 1, wherein the non-super strong acid polymer electrolyte is an aromatic polymer electrolyte?

16. The laminated membrane according to Claim 1, wherein the membrane (II) is the surface layer on at least one surface.

17. The laminated membrane according to Claim 1, wherein the proportion of the membrane (II) in the laminated membrane is 0.1 wt% to 50 wt%.

18. A laminated membrane comprising a membrane (III) which comprises a perfluoroalkylsulfonic acid polymer electrolyte and a membrane (IV) which comprises a non-super strong acid polymer electrolyte.

19. The laminated membrane according to Claim 18, wherein the non-super strong acid polymer is a hydrocarbon polymer.

20. The laminated membrane according to Claim 19, wherein the hydrocarbon polymer is an aromatic hydrocarbon polymer.

21. The laminated membrane according to Claim 18, wherein the membrane (III) is the surface layer on at least one surface.

22. The laminated membrane according to Claim 18, wherein

the proportion of the membrane (III) in the laminated membrane is 0.1 wt% to 50 wt%.

23. A method of producing a laminated membrane, comprising applying a solution of aromatic polymer containing a super strong acid group on a membrane (II) which comprises one electrolyte selected from the group consisting of perfluoroalkylsulfonic acid polymer electrolytes and non-super strong acid polymer electrolytes, and drying this.

24. A method of producing a laminated membrane, comprising applying a solution of a perfluoroalkylsulfonic acid polymer on a membrane (IV) which comprises a non-super strong acid polymer electrolyte, and drying this.

25. The production method according to Claim 24, wherein the solvent of the perfluoroalkylsulfonic acid polymer solution is a solvent containing a halogenated solvent in an amount of 1 wt% or more.

26. A fuel cell comprising the laminated membrane according to Claim 1 or 18.

27. The fuel cell according to Claim 26, wherein a mixture of carbon carrying a catalyst and perfluoroalkylsulfonic acid resin fixed on an electrode is used as a current collector.